

IN THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

- 1 1. (currently amended) An optical switch, comprising:
 - 2 a first optical combiner for combining at least two optical pump signals to
 - 3 produce a combined pump signal, and a second optical combiner for combining
 - 4 an input data signal with the combined pump signal to produce a combined signal;
 - 5 a non-linear optical element for imparting a non-linear effect on the combined
 - 6 signal to generate a number of optical bands based on a simultaneous three-signal
 - 7 interaction of the at least two optical pump signals and the input data signal; and
 - 8 at least one optical splitter for separating the combined signal from said non-linear
 - 9 optical element into respective generated optical bands;
 - 10 wherein at least one of said at least two optical pump signals is controllably
 - 11 modulated such that a logic sequence of said input data signal is controllably switched.
- 1 2. (original) The optical switch of claim 1, further comprising at least two optical
2 pump sources, each of said sources providing one of said at least two optical pump
3 signals, wherein at least one of said at least two optical pump sources is adapted to
4 controllably modulate its respective optical signal such that a logic sequence of said input
5 data signal is controllably switched and an output signal of said optical switch comprises
6 a multi-band switched optical signal.
- 1 3. (previously presented) The optical switch of claim 1, wherein said input data
2 signal has a frequency that is substantially equal to an average of respective frequencies
3 of said at least two optical pump sources.
- 1 4. (original) The optical switch of claim 2, further comprising a controller for
2 controlling the modulation of the at least one modulated optical pump source.

- 1 5. (original) The optical switch of claim 2, wherein one of said at least two optical
2 pumps is modulated and all other optical pumps are maintained constant.
- 1 6. (original) The optical switch of claim 5, wherein a resulting multi-band switched
2 output signal is substantially a Boolean AND combination of the logic sequence of said
3 input data signal and the logic sequence of said modulated optical pump signal.
- 1 7. (original) The optical switch of claim 5, further comprising a variable delay line
2 for synchronizing the input data signal and the modulated optical pump.
- 1 8. (original) The optical switch of claim 1, wherein said non-linear optical element
2 comprises a highly non-linear fiber.
- 1 9. (original) The optical switch of claim 1, wherein said non-linear optical element
2 generates a parametric amplification of the combined signals.
- 1 10. (previously presented) The optical switch of claim 9, wherein said non-linear
2 effect comprises difference frequency generation.
- 1 11. (original) The optical switch of claim 9, wherein an output of said optical switch
2 comprises a replica of said input data signal and at least three idler signals.
- 1 12. (original) The optical switch of claim 11, wherein said at least three idler signals
2 comprise at least two mirrored idler signals and at least one translated idler signal.
- 1 13. (original) The optical switch of claim 12, wherein said mirrored idler signals
2 comprise input data signal conjugates.
- 1 14. (previously presented) The optical switch of claim 9, wherein each wavelength of
2 said input data signal is converted into a corresponding wavelength in said respective
3 generated optical bands.

1 15. (original) The optical switch of claim 2, wherein said optical pump sources
2 comprise laser sources.

1 16. (previously presented) The optical switch of claim 1, wherein each of said first
2 and second optical combiner comprises a band splitter.

1 17. (original) The optical switch of claim 1, wherein said at least one optical splitter
2 comprises a band splitter.

1 18. (previously presented) A method of optical switching using a fiber parametric
2 device having at least two optical pump sources, comprising:
3 combining a signal from each of said at least two optical pump sources in a first
4 combiner to produce a combined pump signal, and combining the combined pump signal
5 with an input data signal to produce a combined signal;
6 imparting a non-linear effect on the combined signal to generate a number of
7 optical bands based on a simultaneous three-signal interaction of the two optical pump
8 signals and the input data signal; and
9 controllably modulating at least one of said at least two optical pump sources such
10 that a logic sequence of said input data signal is controllably switched.

1 19. (previously presented) The method of claim 18, further comprising separating
2 said generated optical bands using one or more band splitters.

1 20. (previously presented) The method of claim 19, wherein said non-linear effect
2 generates a parametric amplification of said combined signal such that an output of said
3 fiber parametric device comprises one or more switched optical signals corresponding to
4 one or more of the generated optical bands.

1 21. (original) The method of claim 20, wherein the output of said fiber parametric
2 device comprises at least a replica of said input data signal and three distinct idler bands.

1 22-23. (canceled)

1 24. (previously presented) An optical switch, comprising:

2 a first optical combiner for combining at least two optical pump signals to
3 produce a combined pump signal, and a second optical combiner for combining
4 an input data signal with the combined pump signal to produce a combined signal;
5 a non-linear optical element for imparting a non-linear effect on the combined
6 signal; and

7 at least one optical splitter for separating the combined signal from said non-linear
8 optical element into respective generated optical bands;

9 wherein at least one of said at least two optical pump signals is controllably
10 modulated such that a logic sequence of said input data signal is controllably switched;
11 and

12 wherein said input data signal has a frequency that is substantially equal to an
13 average of respective frequencies of said at least two optical pump sources.